

Impact of Microfinance on Smallholder Cassava and Rice Farms Productivity in Makurdi Metropolis, Benue State, Nigeria

Ogebe Ozoko Frank*, Ali Ayuba and Olagunju Ishaqa Oladapo

Department of Agricultural Economics, Federal University of Agriculture, PMB 2373 Makurdi, Benue State, Nigeria.

* Corresponding Author's Contact Details: Email address : frankozoko@gmail.com; Phone No : +234, 07035945500

Accepted October 14, 2020

The concept of microfinance lies in the belief that microfinance institutions could empower poor farmers through easy access to credits to increase their agricultural productivity and battle food poverty. Thus, this study was undertaken to investigate the impact of microfinance on agricultural productivity by smallholder farmers in Makurdi Metropolis of Benue State, Nigeria. Data were randomly collected from 120 farmers consisting of 60 Credit Beneficiaries (CB) and 60 Non-Credit Beneficiaries (NCB) using a well well-structured questionnaire which were analyzed through descriptive statistics and multiple regression analysis. The results of the regression analysis showed a positive impact of microfinance credit on agricultural productivity. Findings revealed that; the accessed credits help farmers to purchase inputs and improve farming technologies, which ultimately transformed into the higher productivity of the credit beneficiaries as CB farmers realized higher yields (52.1 bags) compared to the NCB farmers (24.6 bags). This is partly because the CB were relatively better in the use of inputs such as the adoption of improved seeds, use of fertilizers and affordability of hired labour which ultimately enhanced their farm productivity. The study concluded that though microfinance credits has a significant impact on agricultural productivity under smallholder farmers, access to microfinance credits by smallholder farmers in the study area is constrained by lack of microfinance credit information, high interest rates, and inadequate supply of credit institutions as well as risk-averse nature of some farmers. Thus, to enhance agricultural productivity and improve the well-being of smallholder farmers, it is recommended that smallholder farmers should be facilitated to form "Credits and Saving Cooperative Unions" (SACCOS) for collective responsibilities of accessing credits and paying loans.

Keywords: Beneficiaries, Credits, Microfinance, Outputs, Productivity.

INTRODUCTION

The revitalization of the agricultural sector has been the major concern of the Nigeria government. There is a need to increase agricultural productivity as

agriculture remains the leading non-oil sector of Nigerians population. The main objective of the agricultural policy of Nigeria is the attainment of self-

sufficiency in basic foods commodities-through increase food production and processing of export crops, modernization of agricultural production as well as processing and storage for distribution. In the 1980s, the agricultural sector accounted for 53% of Nigeria GDP and this has drastically dropped to 21.9% in 2019 (Okpara, 2010). The agricultural sector of Nigeria is dominated by small farm producers who usually reside in the rural areas. It is observed that over 80% of the rural population in Nigeria is small-holder farmers (Mellor and Malik, 2017). Thus, the present system by which small-scale farmers depends on non-institutional finance sources (friends, relatives and money lenders) for loans has been hindering agricultural productivity. However, it is often argued that capital from these sources is generally low and inadequate relative to the need for agriculture in general (Guirking and Boucher, 2008).

Besides, there are many factors, which hindered sustained development of small scale agriculture, such as low technological level, inadequate inputs, poor storage facilities, inaccessibility to credits among others. Based on the above, the Federal Government has realized that raising small scale farmers output and income is essential for economic development and political stability. As part of a government strategy to address the problem of low agricultural productivity in the sector, several policies and projects were being formulated. These include developing rural infrastructure, the supply of fertilizers, seeds and other inputs, improving agricultural extension services, and provision of credits to small-holder farmers. Thus, the concept of microfinance was premised in the belief that microfinance institutions could empower farmers through easy access to credits so as to increase their agricultural productivity and fight against food poverty.

Modern microfinance in Nigeria began as non-profit institutions, a strategy initiated to address poverty. These microfinance institutions have grown phenomenally, driven largely by expanding informal sector activities and the reluctance of commercial banks to fund emerging government supported cooperatives with a collateral requirement, which majority of the poor cannot fulfill. In response to this, poor households have developed a wide variety of informal community-based arrangements to meet

their financial needs (Majeha and Nwachukwu, 2008). Currently, Nigeria is estimated to have more than 5,000 microfinance institutions (MFIs). As the number of MFI has increased across the country, there is growing interest in understanding the nature of MFI and how they are impacting on the credit beneficiaries. Although there have been several studies to access the impact of microfinance on rural development, a high proportion of them have been focusing on poverty eradication, such as children's education (MkNelly and Christopher, 1999), improving health outcomes for women and children (Khandker, 2005) and empowering women by participation in microfinance programs (Premaratne, 2009). In contrast, there is inadequate empirical evidence to assess the impact of microfinance on agricultural productivity in rural areas where the majority of low income and subsistence farmers exist. The Theoretical framework is based on the 'minimalist-integrated approaches' argumentation to the provision of rural microfinance. Borrowing from the works of Ledgerwood (2002), who discussed the 'minimalist-integrated' nexus, the study used the perspectives to establish the relationship between microfinance and smallholder farming. The minimalists argue that the only single "missing piece" in enterprise development is credit (Ledgerwood, 2002). The 'minimalist approach' does not work well for smallholder farmers, since the provision of 'credit only' without follow-up services is likely to be detrimental. The poor farmers are tempted to use the acquired credit for other uses other than the intended. The 'fungible' behaviour is explained by a lack of follow-up services, such as training in financial management. On the other hand, the integrated approach looks attractive and convincing. This calls for the provision of both financial and non-financial intermediation. The latter includes training, social intermediations, social services provision and enterprise developmental services. According to Ledgerwood (2002), MFIs that offer non-financial services often face sustainability challenges, hence, they need to be sufficiently funded. They can also form strategic partnerships with the government and donor agencies to promote the integrated approach to microfinance provision. Such partnerships are likely to enhance the sustainability of smallholder farmers. This study argues that the integrated approach to the provision of microfinance can

effectively promote smallholder farmers and other vulnerable groups of society. Small-holder farmers need government support to improve their productivity, which also promotes their livelihood to contribute towards rural economic development. This study sets out to fill this important information gap, especially by comparing those who have access to micro-credit with those who do not in areas of input use and agricultural outputs. It is hoped that using those who have no access to credit as a control group will show clearly whether credit makes or does not make a difference to agricultural output among small scale farmers.

METHODOLOGY

The study was carried out in Makurdi Metropolis of Benue State, Nigeria. The choice of this local government for this study stemmed from the fact that it is an agricultural dominated area, and there is a considerable number of microfinance institutions in the area. Geographically, the Local Government lies between Latitude 7° 43'50N and Longitude 8° 32'10E (Figure 1) with an estimated population of three million, three hundred and seventy-seven (300,377) people (NPC, 2007).

The State is predominantly an agriculture catchment area specializing in human capital and material resources. The average rainfall is 1500-1800 mm, with an average temperature of 27°C. The local government is made up of 11 wards namely North Bank1, North Bank11, Tse Bank, Fiidi Ward, Clerk/market, Ankpa/Wadata, Wailomayo/High Level, Makurdi central. Others are Modern Market, Agan and Mbalagh council wards. Makurdi is the Administrative Headquarters of the Local Government Area. The population of this study consisted of small-holder cassava and rice farmers. The study used households as a sampling frame. According to the National Population Census (NPC, 2007), Makurdi Local Government Area had a population of 300,377 people with 59,816 households comprising 154,138 males and 146,239 females. Respondents were categorized into credit beneficiaries (CB) and non-credit beneficiaries (NCB). Purposive and multi-stage random sampling procedure was used to select the respondents. The first stage was the purposive selection of Makurdi

Metropolis of Benue State due to a considerable number of microfinance institutions in the area. The second stage involves the random selection of five (5) main wards in the study area. From available statistics, there are 24,000 households in the sampled area. The third stage was a random selection of 0.5% of the total number of households (sample frame) across the five wards making a total of 120 respondents (i.e. 60 credit beneficiaries and 60 non-credit beneficiaries) of microfinance credits. Well-structured questionnaires were administered to respondents as a research instrument. The data from the study were subjected to both descriptive and inferential statistics. Simple descriptive tools such as averages, frequency distribution, and standard deviation were used to describe the socio-economic characteristics of the respondents and constraints faced by small-holder farmers in the study area (objectives i and vi). T-test was used to estimate smallholders' credit accessibility and levels of inputs (objective iii). Multiple Linear regression Model was used to ascertain the impact of microfinance on agricultural productivity of small-holder farmers in the area (objective v).

(a) T- test: Following Yim et al. (2010), t-test was applied to test the difference between means of variables regarding the two farmer categories (i.e. CB and NCB). Mean values were calculated as follows:

$$t = \frac{X_1 - X_2}{\sqrt{S_1^2/N_1 + S_2^2/N_2}} \quad \text{..... equation (1)}$$

Where:

X_1 and X_2 are sample means of alternative groups;
 S_1 and S_2 are sample variables for the two groups;
 N_1 and N_2 are sample size for the compared groups.

(b) Multiple linear regression model: It is assumed that there is approximately linear relationship between the dependent variable (Y) and the independent variables $X_1, X_2, X_3, X_4, X_5, X_6$. Therefore, the regression model was expressed as follows:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6) \quad \text{.....equation (2)}$$

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \mu \quad \text{.....equation (3)}$$

Where:

Y = Output from farm (Kg)

X_1 = Quantity of fertilizers (Kg)

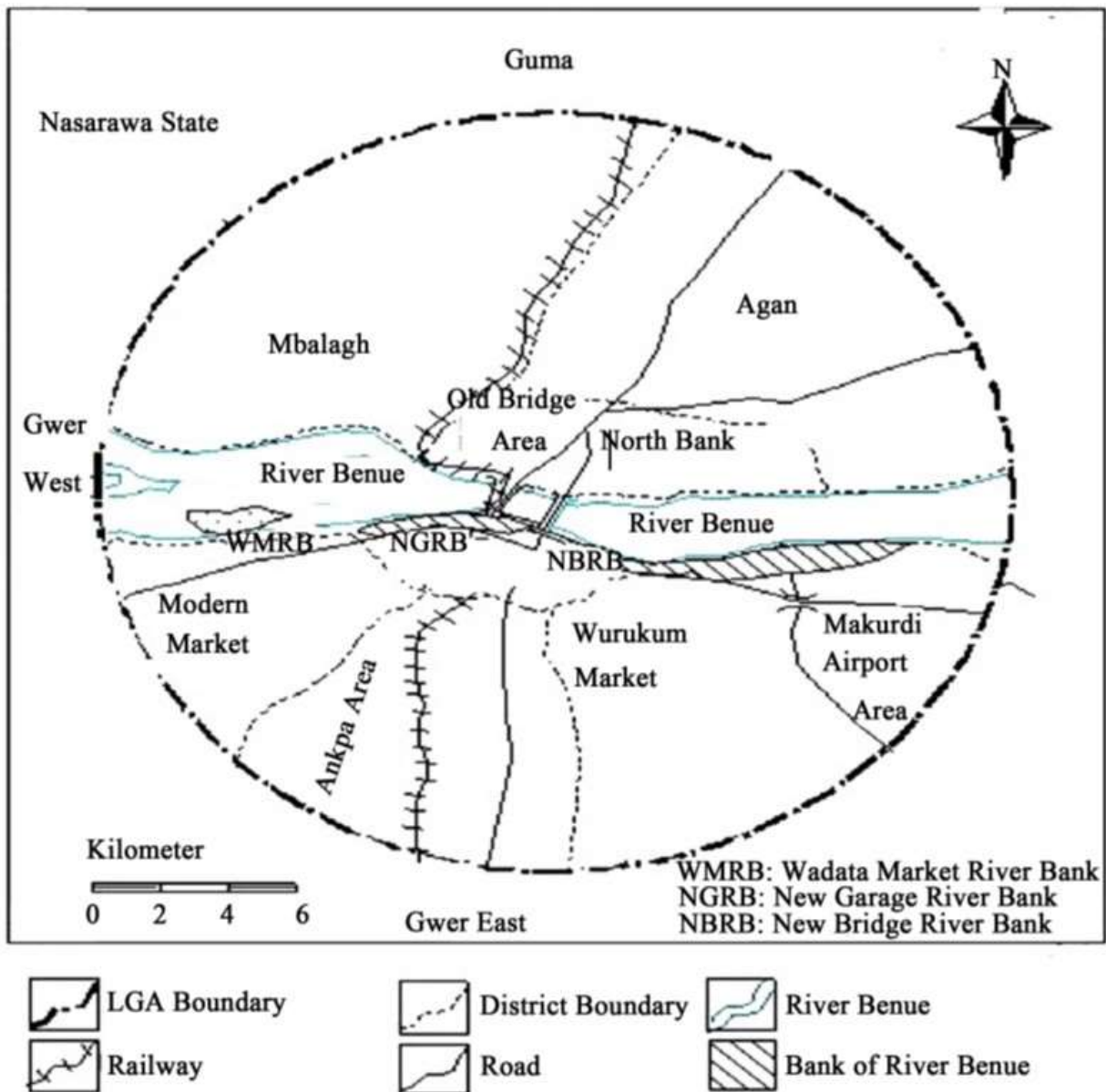


Figure 1: Map of Makurdi, Benue State, showing the study areas.

X2 = Quantity of herbicides (Liters)
X3 = Technology used (Tractor)
X4 = Quantity of improved seed (Kg)
X5 = Land size (Hectares)
 α = Constant
 β 's = Coefficients to be estimated
 μ = Stochastic error term

RESULTS

The results of descriptive statistics (Table 1) showed the percentage of respondents based on CB and NCB. A gender comparison showed that 63.3% of the CB were men compared to 36.7% of women, suggesting that men were more active in seeking and

Table 1. Socio-economic Characteristics of Respondents (n = 120).

Variables	Credit beneficiaries (CB)		Non -credit beneficiaries (NCB)	
	Frequency	Percentage	Frequency	Percentage (%)
Gender				
Male	38	63.3	33	55.0
Female	22	36.7	27	44.0
Age (years)				
16-25	3	5.0	9	15.0
26-35	13	21.7	12	20.0
36-45	32	53.3	27	45.0
46-54	9	15.0	8	13.3
55 and above	3	5.0	4	6.7
Education				
Non formal	0	0.0	2	3.0
Primary	47	78.3	46	76.7
Secondary	11	18.3	11	18.3
Tertiary	2	3.4	1	2.0
Main occupation				
Farming(agriculture)	52	86.7	53	88.3
Petty trading (business)	8	13.3	7	11.7
Family size				
1-4	9	15	12	20.1
5-8	31	51.7	32	53.3
9-12	18	30	14	23.3
13 and above	2	3.3	2	3.3
Mean		6.6		6.8
Farm size(hectares)				
1-2	5	8.3	6.0	10.0
3-4	34	56.7	38	63.3
5-6	15	25.0	13	21.7
7-8	4	6.7	2	3.3
9 and above	2	3.3	1	1.7
Mean		4.1		3.9

accessing credits compared to women. This is quite similar with to experience observed in most commercial banks in Nigeria where only a few women can access credit facilities compared to men. This is because a high proportion of women in Nigeria do not own valuable assets such as houses or land which commercial banks often demand as collateral for obtaining loans. In other words, the cultural and traditional belief that women will get married and will belong to another clan limits women access to fungible assets used as collateral for loans in Nigeria.

The study revealed that the main economic activity of the respondents was agriculture as majority (87.5%) is involved in agriculture. However, a larger proportion (13.3%) of the CB was involved in other petty businesses compared to 11.7% for NCB. The majority (53.3%) of the CB aged between 36-45 years suggesting that this group consists of the most economically active segment of the population. Also, a high proportion of this age category has more family responsibilities such as raising children, payment for education and health services. Thus, accessing

Table 2. Profile of Microfinance Institutions and Mean Amount of Loan Accessed by Beneficiaries.

Loan (N)	No. of Beneficiaries (%)	Mean of Loan disbursed (N)	Proportion of Loan used for Agriculture (%)
>400,000	2.8	362,255	12.5
400,001-600,000	38.0	820,000	20.0
600,001-800,000	33.2	1,002,200	20.4
800,001-1,000,000	21.3	1,227,611	26.4
1,000,001-1,200,000	0	0	0
1,200,001-1,400,000	2.0	1,441,118	32.1
1,400,001-1,600,000	0	0	0
1,600,001-1,800,000	1.7	1,334,122	24.1
1, 800,001+	1.0	1,664,232	26.3
Overall mean loan	100	700,000.49	28.2

credit for this age group has a multiplier effect in that, it benefits the applicants and also the dependents. In terms of education, the study found no significant difference between CB and NCB in the sampled area. The majority (77.5%) of the respondents obtained primary education while few (19.5%) have secondary education or tertiary education. Findings showed that 78.3% of the respondents from the CB group obtained primary education and only 21.7% had their secondary or tertiary education while it was 76.7% and 20.3%, respectively, for NCB respondents. None of the CB had formal education compared to 3.0% for NCB. The majority (52.5%) of the respondents had a range of 5 to 8 persons per household with an average of 6.7 persons. A comparison across CB and NCB showed that the former had an average of 6.6 persons per household with the corresponding figure of 6.8 for the latter.

The majority (60.0%) of the farmers in the study area had a farm size of between 3.0 – 4.0 hectares. The mean farm size was 4.1 hectares for CB as compared to 3.9 hectares for NCB. This implies that farmers in the study area had enough farmland that if effectively put into use can produce the desired output for family consumption. The result agrees with the report by Olawepo (2010), who found that over 90% of Nigeria's local food production comes from farms, which are usually not more than 10 hectares in size.

Makurdi Metropolis had 14 registered MFI with members being organized in the form of Savings and

Credit Cooperative Organizations (SACCOS). All these SACCOS were supervised by the Local Government Cooperative officers (LGCOS). In total, there were 4,820 members of the SACCOS in the Metropolis of which 52% were men and 48% were women.

The results of descriptive statistics (Table 2) showed that average credit per beneficiaries was ₦700, 000.49. Majority of the beneficiaries invested only ₦197, 400.2 or 28% of the total amounts of credit for agricultural production. This may suggest that the loan received by smallholder farmers had multiple uses and not necessarily intended for agricultural production. The study found rural farmers were also likely to seek credit for other pressing needs such as food, health, and education. The implications are that farmers who divert credit to other activities different from what they borrow the money for, are likely to fail in producing optimally, an act that will contribute to their failure to repay the loans.

The results of descriptive statistics (Table 3) showed that there was a significant difference in the levels of improved seeds ($P < 0.05$) and fertilizer ($P < 0.01$) used between CB and NCB. The CB used on average, 20.4 kg improved seeds and 100.00 kg fertilizer compared to an average of 9.2 kg and 44.6 kg respectively for NCB. The accessed credits from microfinance helps farmers to purchase inputs and improve farming technologies. Credit access by small-holder farmers also improves their market accessibility for agricultural commodities. It was

Table 3. Effects of Credit Accessibility and Levels of Inputs Used among Credit Beneficiaries and Non-beneficiaries.

Inputs	Respondent category	Mean	Variance	Standard deviation	t-value	2-Tail sig. (P-value)
Fertilizer	With credit (n =60)	100.0	1.96	1.4	0.16	0.78***
	Without credit (n =60)	44.6	2.56	1.6		
Improved seed	With credit (n =60)	20.4	256	16	2.8	0.03**
	Without credit (n =60)	9.2	196	14		
Tractor	With credit (n =60)	0.3	0.36	0.6	1.88	0.09 ^{ns}
	Without credit (n =60)	0.02	0.16	0.4		
Hand hoe	With credit (n =60)	60	0.81	0.9	1.52	0.44 ^{ns}
	Without credit (n =60)	60	0.49	0.7		
Pesticides	With credit (n =60)	1.4	0.81	0.9	0.28	0.87 ^{ns}
	Without credit (n =60)	1.2	0.36	0.6		

*** Significant ($P < 0.01$), ** ($P < 0.05$), ns (non-significant).

found that 79.6% of the respondents from the CB used the loan for buying farm inputs while 20.4% reported using the loan for hiring farm labourers. Findings showed that farmers who accessed credits were able for hired labor and trucks to carry products to the market centers where they fetched relatively high price compared to farm gate prices. Among the NCB, it was found that credit constraints reduced their agriculture outputs. This is in line with the study by Guirkingner and Boucher (2008) who found that credit constraints reduced agricultural output in Peru by 26%. Nevertheless, this study observed no significant difference in using tractor and hand hoe. Generally, farming technology was dominated by hand hoe.

Results of the T-test (Table 4) showed a significant difference ($P < 0.01$) in aggregate productivity between CB and NCB. Credit beneficiaries (CB) produced an average of 52.1 bags per hectare (5210 kg) compared to 24.6 bags or 2460.2 kg for NCB. Credit beneficiaries also had more output for the individual crop of cassava ($P < 0.01$) and rice ($P < 0.1$). This implies that, the farms managed by CB were more productive than that of the NCB mainly because of high inputs used. Results obtained from multiple regression analysis (Table 5) showed the positive and significant impact of fertilizer, improved seeds

and hired labour on cassava and rice outputs. The study found that the coefficient of fertilizer was positively correlated with agricultural productivity and was statistically significant ($P < 0.01$), this suggests that increase in fertilizer application by one unit would lead to increase productivity by 0.266 units. Also, the coefficient of improved seeds showed a positive and direct relationship with agricultural productivity and was statistically significant at 1% level of probability. This implies that a one unit increase in improved seed application will result in 0.211 unit increase in agricultural productivity in the study area. Similarly, hired labour was positively correlated with agricultural productivity and was statistically significant ($P < 0.01$). Thus, a one unit increase in hired labor would increase agricultural productivity by 0.321 level of probability *ceteris paribus*.

Although, improved farming technology (tractor), land size and herbicides were not significant. However, these variables have a positive correlation with agricultural productivity suggesting that increase use of farming technology, proper application of herbicides as well as increasing land size will increase agricultural productivity in the study area. These findings are in contrast with those of Cornia (1985) who reported a higher yield by farmers with small farms. The author reported a strong negative

Table 4. T-test Results for Effects of Credit on Aggregate Agricultural Productivity and Mean Output Level of Farmers.

Category	Mean	Variance	Standard deviation	t-value	2-Tail sig. (P-value)
Total production					
Credit beneficiaries (n =60)	52.1	784.0	28		
Non beneficiaries (n =60)	24.6	309.8	17.6	3.3	0.002***
Cassava					
Credit beneficiaries (n =60)	30.2	376.4	19.4		
Non beneficiaries (n =60)	14.3	158.8	12.6	2.6	0.004***
Rice					
Credit beneficiaries (n =60)	21.9	222.0	14.9		
Non beneficiaries (n =60)	10.1	139.3	11.8	2.4	0.027*

*** Significant ($P < 0.01$), ** ($P < 0.05$), * ($P < 0.1$).

Table 5. Regression Estimates of Determinants of Agricultural Productivity.

Variables	Coefficients	t-value	2-Tail sign. (P-value)
Constant	-1.626	4.118	0.000***
Fertilizer	0.266	3.255	0.001***
Improved seeds	0.211	2.520	0.012***
Tractor	0.133	1.677	0.087 NS
Hired labor	0.321	3.224	0.002***
Land	0.511	2.618	0.877 NS
Herbicides	0.154	1.545	0.065 NS
R ²	0.76		
Adjusted R ²	0.74		

*** Significant ($P < 0.01$), NS (not significant).

correlation between farm sizes on the one hand, and factor inputs and yields per hectare on the other where it was observed that the decline in yields for increasing farm size could be attributed to decreasing returns to scale.

Results of descriptive statistics (Table 6) showed various reasons for failure to access credit services in the study area. The majority (61.2%) of respondents reported lack of MFI information as main constraint hindering them from accessing credit. This problem was similarly reported among female smallholder farmers in Sri- Lanka which according to Premaratne (2011), found that accessibility of

microfinance depends on factors, such as the level of household income, availability of information, interest rate and collateral availability. Also, most (60.4.0%) of the farmers complained of the small size of loans and high interest rates. When interest rates are high, it is a disincentive for farmers to borrow as the benefit of agricultural productivity will not be realized because of paying the debts.

More importantly, the amount of loans accessed by beneficiaries have some implications. If a small amount of loans is accessed by farmers, it would increase the household transaction costs as well as will not enable them to make long-term income

Table 6. Constraints of Small-holder Farmers Access to Microfinance Credit.

Constraints	Frequency	Percentage (%)
Lack of information about microfinance activities	98	81.7
Small loan size	79	65.8
High interest rate	66	55.0
Simply risk averse	48	40.0
Do not want loan	33	27.5

* >100% due to multiple responses.

change for the household. These results agree with the findings of Chulangani and Ariyawardanad (2010) who reported that the transaction costs of borrowing declines as the size of loan increases. Findings further revealed that some respondents could not access loan simply because they are risk averse (29.6%) or did not want any credit (20.4%). Present result supported those reported by Rweymamu et al. (2003), who reported that 60% of the respondents in Mbozi district of Tanzania mentioned the level of interest rate to be a factor affecting their decision to borrow.

DISCUSSION

Results from the T-test analysis (Table 4) showed a positive impact of microfinance in agricultural productivity. The accessed credits from microfinance help farmers to purchase inputs and improve farming technologies. According to Green and Ng'ong'ola (1993), access to credits by farmers could influence fertilizers application. Carte (1989) also reported a positive relationship between credit and agricultural productivity. The emphasis of microfinance is that farmers should be in groups for accessing credits. This helps to reduce the transaction costs and creates a collective responsibility of borrowers to repay the loan. Credit access by small-holder farmers also improves their market accessibility for agricultural commodities. Findings showed that farmers who accessed credits were able for hired labor and trucks to carry products to the market centers where they fetched relatively high price compared to farm gate prices. Among the NCB, it was discovered that credit constraints reduced their

agriculture outputs. This is in line with study by Guirkingner and Boucher (2008) who found that credit constraints reduced agricultural output in Peru by 26%. However, the study suggested that access to credit by small-holder farmers is important but not sufficient by itself to have optional farm productivity. It needs other factors such as extension services and efficient markets to compliment credit accessibility to have optimal farm productivity. The study revealed that men outnumbered women in accessing the microfinance credit. This is quite similar with the experience observed in most commercial banks in Nigeria where only few women are able to access credit facilities compared to men. This is because a high proportion of women in Nigeria do not own valuable assets such as houses or land which commercial banks often demand as collateral for obtaining loans. In other words, the cultural and traditional belief that women will get married and will belong to another clan limits women access to fungible assets used as collateral for loans in Nigeria. These findings are similar to those reported by Ajagbe (2012) who observed that the demand for credit was strongly influenced by the gender, age, education, the value of assets owned and other dwelling characteristics.

Findings showed that although, loans were borrowed for agricultural production, only 28% of the loan was invested in the sector. This may suggest that the loan received by small-holder farmers had multiple use and not necessarily intended for agricultural production. This means that rural farmers were also likely to seek for credit for other pressing needs such as food, health, and education. Oboh and Ekpebu (2010) also reported a similar experience from Benue State, Nigeria, where their

study found that about 43.9% of the loan received by smallholder farmers was diverted to non-farming activities. The implications are that farmers who divert credit to other activities different from what they borrow the money for, are likely to fail in producing optimally, an act that will contribute to their failure to repay the loans.

Despite the friendly access to microfinance by farmers and the positive impacts on agricultural productivity, there are number of factors that constrained microfinance access and sustainability by small-holders. These include small size of loans, high interest rate and lack of microfinance information amongst others. This problem was similarly reported among female smallholder farmers in Sri-Lanka which according to Premaratne (2011), found that accessibility of microfinance depends on factors such as the level of household income, availability of information, interest rate and collateral availability. When interest rates are high, it is disincentive for farmers to borrow as the benefit from agricultural productivity will not be realized because of paying the debts. More importantly, the amount of loans accessed by beneficiaries have some implications. If a small amount of loans is accessed by farmers, it would increase the household transaction costs as well as will not enable them to make long-term income change for the household. These results agree with the findings of Chulangani and Ariyawardana (2010) who reported that the transaction costs of borrowing declines as the size of loan increases. Present result supported those reported by Rweymamu et al. (2003), who reported that 60% of the respondents in Mbozi district of Tanzania mentioned the level of interest rate to be a factor affecting their decision to borrow.

Results obtained from multiple regression analysis for small-holder farmers showed positive and significant impacts on cassava and rice outputs for variables of fertilizer, improved seeds and hired labor. Although, improved farming technology (tractor), land size and herbicides were not significant. However, these variables have positive correlation with agricultural productivity suggesting that increase use of farming technology, proper application of herbicides as well as increasing land size will increase agricultural productivity in the study area. These findings are in contrast with those of Cornia (1985) who reported a higher yield by farmers

with small farms. The author reported a strong negative correlation between farm sizes on the one hand, and factor inputs and yields per hectare on the other where it was observed that the decline in yields for increasing farm size could be attributed to decreasing returns to scale.

CONCLUSION

The study was undertaken to investigate the impact of microfinance institutions (MFIs) on small-holder farm productivity with particular reference to cassava and rice farmers. Findings showed a significant difference in input use and farm productivity between credit beneficiaries (CB) and non-credit beneficiaries (NCB), where it was found that the outputs of the CB were persistently high compared to the outputs of NCB. The estimates of the regression analysis suggest that the level of input use (fertilizers, improved seeds, and hired labor) has a significant impact on agricultural productivity.

Although, the use of a tractor, herbicides as well as land size were not significant in determining agricultural productivity, nevertheless, they were found to have a positive relationship with agricultural productivity. This suggests that increasing use of tractors, proper application of herbicides as well as increasing land size will increase agricultural productivity in the study area. The study revealed that though, MFI credits has significant impact on agricultural productivity under small-holder farmer's access to microfinance credits in the study area is constrained by lack of microfinance credit information, high interest rates, and inadequate supply of credit institutions as well as risk averse nature of some farmers. To enhance agricultural productivity and improve the well-being of small-holder farmers, it is recommended that they should be facilitated to form Savings and Credit Cooperative Unions (SACCOS) for collective responsibilities of accessing credits and paying loans.

AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among authors. The first author designed the research instrument and analyzed the data. All the authors

interpreted the data, read the final manuscript, and agreed with all contents.

REFERENCES

- Ajagbe FA (2012). Application of probit to factors affecting small scale enterprises' decision to take credit: A case study of Oyo State, Nigeria. *Asian Economic and Financial Review*, 2(8): 1064-1071.
- Carte M (1989). The impact of credit on peasant productivity and differentiation in Nicaragua. *Journal of Development Economics*, 31(4): 13-36.
- Chulangani HMA and Ariyawardand A (2010). Analysis of Lending by Public and Private Micro-Financial Institutions to Microenterprises in Nuwara Eliya. *Sabaragamuwa University Journal*, 7(1): 86-100.
- Cornia G (1985). Farm size, land yields and agricultural production function: An analysis for fifteen developing countries. *World Development*, 13(4): 513-534.
- Green D and Ng'ong'ola D (1993). Factors affecting fertilizer adoption in less developed countries. An application of multivariate logistic analysis in Malawi. *Journal of Agricultural Economics*, 44(1): 99-109.
- Guirkinger C and Boucher S (2008). Credit constraints and productivity in Peruvian agriculture. *Journal of Agricultural Economics*, 39(3): 295-308.
- Khandker S (2005). Microfinance and poverty: Evidence using panel data from Bangladesh. *The World Bank Economic Review*, 19.
- Ledgerwood J (2002). *Microfinance handbook. An institutional and financial perspective. Banking with the poor.* Washington D. C: The World Bank.
- Majeha RO and Nwachukwu I (2008). *Microfinance Institutions in Nigeria*, MPRA Paper, No. 13711.
- Mellor JW and Malik SJ (2017). The impact of growth in small commercial farm productivity on rural poverty reduction. *World Development*, 91: 1-10.
- MkNelly B and Christopher D (1999). Impact of credit with education on mothers and their young children's nutrition: Crecer credit with education program in Bolivia. *Freedom from Hunger Research Paper No. 5*. Davis, CA: Freedom from Hunger.
- National Population Census (NPC, 2006). *National Population Census Report*, National Population Commission, Abuja.
- Oboh V and Ekpebu I (2010). Determinants of formal agricultural credit allocation to the farm sector by arable crop farmers in Benue State, Nigeria. *African Journal of Agricultural Research*, 6(1): 29-36.
- Okpara BC (2010). Export Marketing: Catalyst for Nigeria Economic. *Research Journal of International Studies*, 13: 76-85.
- Olawepo RA (2010). Determining farmers' income: A rural Nigeria experience. *Journal of African Studies and Development*, 2(4): 99-108.
- Premaratne SP (2009). Empowerment of women through Self-Help Groups (SHGs): A study of SHG Microfinance Project in Sri-Lanka (forthcoming) with S.M.P). *Senenayaka Tilakaratna, Galappattige and Perera* (2005).
- Rweymamu DC, Kimaro MP and Urassa OM (2003). *Assessing microfinance services in agricultural sector development: A case study of semi-formal financial institutions in Tanzania.* Economic and Social Research Foundation. Dar es Salaam.
- Yim KH, Nahm FS, Han KA and Park SY (2010). Analysis of statistical methods and errors. *Korean Journal of Pain*, 23: 35-41.